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Art Unit: 2652

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1. Multi-carrier communication system wherein data are transferred bi-directionally in a time division duplexed way, and wherein a first pilot carrier whose instantaneous frequency is a fraction of a sample rate of a first transceiver (VDSL\_U) and which is orthogonal to other carriers used in said multi-carrier communication system, is transferred to enable a second transceiver (VDSL\_N) to recover said sample rate.

CHARACTERISED IN THAT a second pilot carrier whose instantaneous frequency is a fraction of a time division duplexing frame rate and which is orthogonal to other carriers used in said multi-carrier communication system, is transferred from said first transceiver (VDSL\_U) to said second transceiver (VDSL\_N) to enable said second transceiver (VDSL\_N) to recover said time division duplexing frame rate, said second pilot carrier being different from said first pilot carrier.

2. Multi-carrier communication system according to claim 1.

CHARACTERISED IN THAT said first pilot carrier is constituted by interpolating a plurality of carriers.

3. (Amended) Multi-carrier communication system according to claim 1 or claim 2.

CHARACTERISED IN THAT said first pilot carrier and/or said second pilot carrier are/is randomised.

4. (Amended) Multi-carrier communication system according to claim 1 or claim 3.

CHARACTERISED IN THAT said first pilot carrier and/or said second pilot carrier are/is modulated with data.

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5. Multi-carrier transmitter (VDSL\_LT) suitable for use in a time division duplexing system, said multi-carrier transmitter (VDSL\_LT) comprising:

a. first pilot carrier generation means (IFFT, DAC), adapted to generate a first pilot carrier whose instantaneous frequency is a fraction of a sample rate and which is orthogonal to other carriers transmitted by said transmitter (VDSL\_LT); and

b. first pilot carrier transmission means, coupled to said first pilot carrier generation means (IFFT, DAC) and adapted to transmit said first pilot carrier.

CHARACTERISED IN THAT said multi-carrier transmitter (VDSL\_LT) further comprises:

~~c. second pilot carrier generation means (RDI, FFT, T/S, DAC, PLL), adapted to generate a second pilot carrier whose mean frequency is a fraction of a time division duplexing frame rate and which is orthogonal to other carriers transmitted by said transmitter, said second pilot carrier being different from said first pilot carrier; and~~

d. second pilot carrier transmission means, coupled to said second pilot carrier generation means (RDI, FFT, T/S, DAC, PLL) and adapted to transmit said second pilot carrier.

6. Multi-carrier receiver (VDSL\_NT) suitable for use in a time division duplexing system, said multi-carrier receiver (VDSL\_NT) comprising:

a. first pilot carrier receiving means (ADC, S/D, FFT, ROT, PLL), adapted to receive a first pilot carrier whose instantaneous

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frequency is a fraction of a transmitter sample rate and which is orthogonal to other carriers received by said multi-carrier receiver (VDSL\_NT).

CHARACTERISED IN THAT said multi-carrier receiver (VDSL\_NT) further comprises:

b. second pilot carrier receiving means (ADC, S/D, FFT, ROT2, ROT1, PLL1, PLL2), adapted to receive a second pilot carrier whose mean frequency is a fraction of a time division duplexing frame rate and which is orthogonal to other carriers received by said multi-carrier receiver (VDSL\_NT), said second pilot carrier being different from said first pilot carrier.